- Place the membrane/electrode in an oven at 100°-170°
 for 10-60 minutes.
- F. For Carbon/Ru Oxide Electrode application drying, the following steps are taken:

Repeat step A on the opposite side of the membrane.

- G. For acidification, the following steps are taken:
 - For Ion-Exchange, soak membrane/electrodes in lightly boiling dilute MH2S04 solution for 1-3 hours.
 - For cleaning, rinse the membrane/electrodes in deionized water;
 - For drying, dry the membrane/electrodes in air, or air dry then desiccate overnight, or place in a 30°-50° C. oven for 1-3 hours before cutting to the final dimensions.

The present invention may be embodied in other specific 15 forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrated and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

- 1. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;
 - a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;
 - a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

- said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;
- whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- 2. The electrochemical gas sensor as defined in claim 1, further comprising:
 - means for applying DC power across the protonic conductive electrolyte membrane;
 - an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and
 - switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane;

whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes.

3. The electrochemical gas sensor as defined in claim 1, 65 wherein said sensing and counter electrodes comprise carbon.

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- 4. The electrochemical gas sensor as defined in claim 1, wherein said sensing and counter electrodes comprise noble metals.
- 5. The electrochemical gas sensor as defined in claim 1, wherein said sensing and counter electrodes comprise conductive metal oxides.
- 6. The electrochemical gas sensor as defined in claim 1, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 7. The electrochemical gas sensor as defined in claim 1, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 8. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect CO.
- 9. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect NO...
- 10. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect hydrogen.
- 11. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect H₂S.
- 12. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 13. The electrochemical gas sensor as defined in claim 1, wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 14. The electrochemical gas sensor as defined in claim 1, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10–50 wt% of a proton conductor material and 50–90 wt% of a first and a second electrical conductor materials.
- 15. The electrochemical gas sensor as defined in claim 14, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

16. The electrochemical gas sensor as defined in claim 14, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.

- 17. The electrochemical gas sensor as defined in claim 14, wherein one of the first and second electrical conductor materials for the counter electrode is 50–99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1–50 wt% of Ru oxide.
- 18. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:
 - first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane;

means for applying a DC power across the membrane;

said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane;

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- whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
- 19. The electrochemical gas sensor of claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon.
- 20. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals.
- 21. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides.
- 22. The electrochemical gas sensor as defined in claim 18, wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 23. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron 20 mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.
- 24. The electrochemical gas sensor as defined in claim 23, wherein the proton conductor material for both the first and 25 second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 25. The electrochemical gas sensor as defined in claim 23, 30 wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum.
- 26. The electrochemical gas sensor as defined in claim 23, wherein one of the first and second electrical conductor materials for the second pumping electrode is 50–99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 40 to 50 wt% of Ru oxide.
- . 27. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:
- a second protonic conductive electrolyte membrane;
- first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;
- means for applying a DC power across said second protonic electrolyte membrane;
- said first and second pump electrodes having in electrical 55 connection therebetween said means for applying DC power across said second protonic electrolyte membrane;
- whereby the gas is transported away from the counter electrode when said means for applying DC power 60 across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.
- 28. The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.

- 29. The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 30. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;
 - a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;
 - a protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;
 - means for electrical measurement;
 - said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement;
 - means for applying a DC pulse power source across the membrane:
 - said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and
 - switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane;
 - whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and
 - whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes.
- 31. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise carbon.
- 32. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise noble metals.
- 33. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise conductive metal oxides.
- 34. The electrochemical gas sensor as defined in claim 30, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 35. The electrochemical gas sensor as defined in claim 30, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 36. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect CO.
- 37. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect hydrogen.
- 38. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect H_2S .

- 39. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 40. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect 5 NO
- 41. The electrochemical gas sensor as defined in claim 30, wherein the sensing and counter electrodes have a diameter in a range of 1 mm to 15 mm, and the protonic conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.
- 42. The electrochemical gas sensor as defined in claim 41, wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 43. The electrochemical gas sensor as defined in claim 30, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10–50 wt% of a proton conductor material and 50–90 wt% of a first and a second electrical conductor materials.
- 44. The electrochemical gas sensor as defined in claim 43, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 45. The electrochemical gas sensor as defined in claim 43, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.
- 46. The electrochemical gas sensor as defined in claim 43, wherein one of the first and second electrical conductor materials for the counter electrode is 50–99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1–50 wt% of Ru oxide.
- 47. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;
 - a porous mixed ionic-conductive counter electrode having both an electronic conducting material and an ionic conducting material;
 - a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter 50 electrodes;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;
 - a second protonic conductive electrolyte membrane;
 - first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;
 - said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere;
 - said second porous pump electrode being separated from said counter electrode by a perforated support structure

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- composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure:
- means for electrical measurement in electrical contact with said sensing electrode and perforated support structure:
- means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure:
- whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and
- whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- 48. The electrochemical gas sensor as defined in claim 47, wherein the sensing and counter electrodes have a diameter in a range of 1 mm-15 mm, and the protonic conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.
- 49. The electrochemical gas sensor as defined in claim 48, wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 50. The electrochemical gas sensor as defined in claim 47, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.
- 51. The electrochemical gas sensor as defined in claim 50, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 52. The electrochemical gas sensor as defined in claim 50, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.
- 53. The electrochemical gas sensor as defined in claim 50, wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide.
- 54. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect55 CO.
 - 55. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect hydrogen.
 - 56. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect NO_x.
 - 57. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect H_2O vapor.
 - 58. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect H_2S .

- 59. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;
 - a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material;
 - a porous mixed ionic-conductive counter electrode having both an electrical conducting material and an ionic conducting material, and being separate from both said sensing and reference electrodes;
 - a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;
 - means for electrical measurement in electrical contact between the sensing electrode and the counter electrode;
 - means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode;
 - whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and
 - whereby, in a positive ambient concentration of said gas, 35 said electrical measurement means detects changes in said electrical characteristic.
- 60. The electrochemical gas sensor as defined in claim 59, wherein said sensing, count and reference electrodes comprise carbon.
- 61. The electrochemical gas sensor as defined in claim 59, wherein said sensing, count and reference electrodes comprise noble metals.
- 62. The electrochemical gas sensor as defined in claim 59, wherein said sensing, counter and reference electrodes comprise conductive metal oxides.
- 63. The electrochemical gas sensor as defined in claim 59, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 64. The electrochemical gas sensor as defined in claim 59, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 65. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect 55
- 66. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect NO...
- 67. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect hydrogen.

- 68. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect H_2S .
- 69. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 70. The electrochemical gas sensor as defined in claim 59, wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 71. The electrochemical gas sensor as defined in claim 59, wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials.
- 72. The electrochemical gas sensor as defined in claim 71, wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 73. The electrochemical gas sensor as defined in claim 71, wherein one of the first and second electrical conductor materials for the sensing electrode is 50–99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1–50 wt% of platinum.
- 74. The electrochemical gas sensor as defined in claim 71, wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide.
- 75. The electrochemical gas sensor as defined in claim 1, wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes.
- 76. The electrochemical gas sensor as defined in claim 30, wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes.
- 77. The electrochemical gas sensor as defined in claim 47, wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes.
- 78. The electrochemical gas sensor as defined in claim 59, wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes.

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Presented Reissue Claim Onlike original patent claim 1, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode	being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 2, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 79 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrode."		and counter electrodes comprise carbon." Unlike original patent claim 4, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 4, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Original Pratent Claim Reis	2		8	4

	anguage "a two-electrode electrode and the counter nic conductive electrolyte	lage "wherein said sensing	anguage "a two-electrode electrode and the counter nic conductive electrolyte	the language "wherein the solid, perfluorinated, ion-
Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 79 recites the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79	
Original Patent Claim	\$		9	

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Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	79		79	
Original Patent Claim	7		∞	

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 79 recites the language "a two-electrode electrode mical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 79 recites the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		79	
Original Patent Claim	11		12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 13, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 14, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	79		79	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	79		79	
Original Patent Claim	15		16	

ed Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	79		79	
Original Patent Claim	17		18	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
19	79	Unlike original patent claim 19, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 19, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."
20	79	Unlike original patent claim 20, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 20, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 79 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
	Unlike original patent claim electrochemical gas sensor" electrode being the only two membrane."	Unlike original patent claim 2 electronic and ionic conduct conductive metal oxides."	Unlike original patent claim electrochemical gas sensor" electrode being the only two membrane."	Unlike original patent claim 2 first and second pumping e conductive electrolyte membri
Presented Reissue Claim	79		79	
Original Patent Claim	21		22	

d Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	79		79	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	79		79	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 27, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79
Original Patent Claim	27		28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 30, presented reissue claim 79 does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane and counter electrodes."
Presented Reissue Claim	79		79	
Original Patent Claim	29		30	

Presented Differences in the Claim Language	im Reissue Claim	Unlike original patent claim 31, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 31, presented reissue claim 79 does not recite the language "wherein said	Unlike original patent claim 32, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 79 does not recite the language "wherein said
Original	Patent Claim	31	32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	62	Unlike original patent claim 33, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane
		in between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein said
		sensing and counter electrodes comprise conductive metal oxides."
34	62	Unlike original patent claim 34, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane
		in between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein the
		protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-
		exchange polymer."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
35	97	Unlike original patent claim 35, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 35, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36	79	Unlike original patent claim 36, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 37, presented reissue claim 79 does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	79		79
Original Patent Claim	37		38

ed Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 79 does not recite the language "wherein the	Unlike original patent claim 40, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	46	79
Original Patent Claim	39	40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	U Unlike original patent claim 42, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	79	79
Original Patent Claim	41	42

Original Patent Claim 43	Presented Reissue Claim 79	Unlike original patent claim 43, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 43, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
44	79	Unlike original patent claim 44, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 44, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
45	79	Unlike original patent claim 45, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 45, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	79	Unlike original patent claim 46, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 49, presented reissue claim 79 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	79	79
Original Patent Claim	48	49

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 50, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 51, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim			79	
Original Patent Claim	50		51	

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 52, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 52, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 53, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Pres					
Original	Patent Claim	52		53	

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 54, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	62		79
Original Patent Claim	54		55

Original 56 57	Presented Reissue Claim 79	Unlike original patent claim 56, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 56, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ." Unlike original patent claim 57, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of any two 1 mm, the sensing and counter electrodes, and having a thickness in the range
	·	electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 58, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing electrode and the counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 79 does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode; the sensing electrode, means for said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrical measurement in electrical characteristic between the sensing electrode and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane are across said protonic electrolyte membrane across said
Presented Reissue Claim	79	62
Original Patent Claim	28	59

Original Patent Claim	Presented Reissure Claim	Differences in the Claim Language
09	79	Unlike original patent claim 60, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 60, presented reissue claim 79 does not recite the language "wherein
61	79	Unlike original patent claim 61, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 79 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
62	79	Unlike original patent claim 62, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 62, presented reissue claim 79 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63	79	Unlike original patent claim 63, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 64, presented reissue claim 79 does not recite the language "wherein caid sensing counter and reference electrodes commisse conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim		79
Original Patent Claim	64	65

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 66, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO_x ."	Unlike original patent claim 67, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79
Original Patent Claim	99		67

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Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 68, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
	Unlike o electroch between of approyelectrode language mm to 15	Unlike, o electroch	Unlike o electroch between of approvelectrode language mm to 15
Presented Reissue Claim	79		79
Original Patent Claim	89		· ·

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
70	62	Unlike original patent claim 70, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		IIIIII to 15 IIIIII, and being efectricany connected to said efectrical measurements.
·		Unlike, original patent claim 70, presented reissue claim 79 does not recite the language "wherein the
		sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
71	79	Unlike original patent claim 71, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
·		between and in contact with the sensing and counter electrodes, and having a thickness in the range
· · · · · · · · · · · · · · · · · · ·		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane, and also recites the
		nanguage sand sensing and counter electrodes each naving a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 71, presented reissue claim 79 does not recite the language "wherein the
		electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50.
		90 wt% of a first and second electrical conductor materials."

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inted Differences in the Claim Language Claim	Unlike original patent claim 74, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 74, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 79 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	79		
Original Patent Claim	74		75

Original Datent Claim	Presented	Differences in the Claim Language
76	79	Unlike original patent claim 76, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 76, presented reissue claim 79 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic
		and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
77	79	Unlike original patent claim 77, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 77, presented reissue claim 79 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 78, presented reissue claim 79 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Original Presented Patent Claim Reissue Claim	79	
Original Patent Claim	78	

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Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 80 recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 2, presented reissue claim 80 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
r	Unlike original patent claim reacting with the gas to produ and the counter electrode in the	Unlike original patent claim reacting with the gas to produ and the counter electrode in the Unlike original patent claim applying DC power across the between the sensing electrod the protonic conductive eleconnection between the sens means to the means for apply whereby the gas is transport power across the protonic co counter electrodes."
Presented Reissue Claim	08	08
Original Patent Claim	-	2

Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 3, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 4, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	08		08	
Original Patent Claim	3		4	

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Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 3, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	80		08	
Original Patent Claim	\$		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 80 does not recite the language" wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		08	
Original Patent Claim	7		∞	

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Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	08		08	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08		08	
Original Patent Claim	11		12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	08		08	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	08		08	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	80		80	
Original Patent Claim	17		18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	08		80	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 80 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	80		80	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	08		08	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	80	·	80	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 27, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane applying DC power across said second protonic electrolyte membrane applies a DC said means for applying DC power across said second protonic electrolyte membrane applies a DC said means for applying DC power across said second protonic electrolyte membrane applies a DC	
Presented Reissue Claim	08	08
Original Patent Claim	27	. 28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 80 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 80 does not recite the language "means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	08		08
Original Patent Claim	29		30

Differences in the Claim Language		Unlike original patent claim 32, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	08	08
Original Patent Claim	31	32

nted Differences in the Claim Language Claim	Unlike original patent claim 33, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 34, presented reissue claim 80 does not recite the language wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange notymer."
Presented Reissue Claim	08		08	
Original Patent Claim	33		34	

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 35, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		08
Original Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 37, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	08	80
Original Patent Claim	37	38

Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 39, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	08		
Original Patent Claim	39		. 40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 42, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
	Unlike original patent clelectrode reacting with the electrode and the counter of	Unlike original patent clelectrode reacting with the electrode and the counter of Unlike original patent clais sensing and counter electerolyte membrane has
Presented Reissue Claim	08	08
Original Patent Claim	.41	42

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 43, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 44, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a
Original Patent Claim	43		44	

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 45, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 46, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	08		08	
Original Patent Claim	45		46	

Original Patent Claim 47	Presented Reissue Claim 80	Unlike original patent claim 47, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 47, presented reissue claim 80 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrolyte membrane; said first porous pump electrode being separate from said counter electrolyte membrane; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said sensing electrode and perforated support structure; means for electrical measurement in electrical contact with said sensing electrode electrolyte membrane in electrical contact with said second poronic electrolyte membrane in electrical contact with said sensing electrode electrolyte membrane in electrical contact with said first pump electrode and said nectorated support structure; means for applying a DC power across said second poronic electrolyte membrane in electrical contact with said sensing electrode electrolyte membrane in electrical contact with said first bump electrodes and perforated support structure.
		structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	08	08	
Original Patent Claim	48	49	

Differences in the Claim Language m	Unlike original patent claim 50, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 50, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 51, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	08		08	
Original Patent Claim	50		51	

nted Differences in the Claim Language Claim	Unlike original patent claim 52, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 52, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt%, of Ru oxide."
Presented Reissue Claim	08	
Original Patent Claim	52	53

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 54, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	08		08
Original Patent Claim	54		55

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	08	Unlike original patent claim 56, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 56, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57		Unlike original patent claim 57, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
58	08	Unlike original patent claim 58, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 58, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
	08	Unlike original patent claim 59, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 80 does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode; when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane, and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 60, presented reissue claim 80 does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 80 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	08		
Original Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 62, presented reissue claim 80 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	80	08
Original Patent Claim	62	63

Differences in the Claim Language		Unlike original patent claim 64, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		
Original Patent Claim	64		65

Original 66 67	Presented Reissue Claim 80	Unlike original patent claim 66, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 66, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ." Unlike original patent claim 67, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		Unlike original patent claim 67, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

1 Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 68, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08		08
Original Patent Claim	89		69

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 80 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."		proton-electron mixed conductive materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	08		08	
Original Patent Claim	70		71	

d Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 72, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 73, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	08	08
Original Patent Claim	72	73

Original Potent Claim	Presented Deign Claim	Differences in the Claim Language
74	08	Unlike original patent claim 74, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 74, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75	08	Unlike original patent claim 75, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 75, presented reissue claim 80 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 76, presented reissue claim 80 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 77, presented reissue claim 80 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	08		08	
Original Patent Claim	76		77	

nted Differences in the Claim Language Claim	Unlike original patent claim 1, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 2, presented reissue claim 81 does not recite the language "means for applying DC power across the protonic conductive electrode, and the means for applying DC power across the protonic conductive electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and power across the protonic conductive electrolyte membrane applies a DC power to the sensing and power across the protonic conductive electrolyte membrane applies a DC power to the sensing and power across the protonic conductive electrolyte membrane applies a DC power to the sensing and power across the protonic conductive electrolyte membrane applies a DC power to the sensing and power across the protonic conductive electrolyte membrane applies a DC power to the sensing and across the protonic conductive electrolyte membrane applies a DC power to the sensing and across the protonic conductive electrolyte membrane applies a DC power to the sensing and across the protonic conductive electrolyte membrane across th
Presented Reissue Claim	81	81
Original Patent Claim		2

Differences in the Claim Language		Unlike original patent claim 3, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 3, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 4, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented	Reissue Claim	81		81
Original	Patent Claim	ε		4

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 5, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 6, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	81	81
Original Patent Claim	\$	9

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
7	81	Unlike original patent claim 7, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 7, presented reissue claim 81 does not recite the language" wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
∞	81	Unlike original patent claim 8, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 9, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	electrochemical gas sensor is adapted to detect hydrogen."
Prese	Reissue	∞		∞	
Original	Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 11, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 12, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	81	81
Original Patent Claim	=	12

Presented Differences in the Claim Language	m	Unlike original patent claim 13, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first
Prese	Reissue	∞		∞	
Original	Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	81		81	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 17, presented reissue claim 81 does not recite the language "wherein one	of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby, the gas is transported away from the counter electrode when said	means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	81		81		
Original Patent Claim	17		18		

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	81		81	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 21, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 22, presented reissue claim 81 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81
Original Patent Claim	21	22

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	electronic and ionic conducting materials of said first and second pumping electrodes are a proton- electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	81		81	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	81		8	
Original Patent Claim	25		26	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 27, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 81 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid,
Original Patent Claim R	27		28

d Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 81 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 81 does not recite the language "means for applying a DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrodes having in electrical connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means for
Presented Reissue Claim	81		
Original Patent Claim	29		30

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 31, presented reissue claim 81 does not recite the language "wherein said	Unlike original patent claim 32, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	81	81
Original Patent Claim	31	32

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 34, presented reissue claim 81 does not recite the language wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	. 81		81
Original Patent Claim	33		34

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
35	81	Unlike original patent claim 35, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 35, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36	. 81	Unlike original patent claim 36, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37	8	Unlike original patent claim 37, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
38	81	Unlike original patent claim 38, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	81	Unlike original patent claim 39, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range of surroyimately 0.1 mm to 1 mm to
		electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode
		reacting with the gas to produce a change in an electrical characteristic between the sensing electrode
		and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of
		approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 39, presented reissue claim 81 does not recite the language "wherein the
		electrochemical gas sensor is adapted to detect H ₂ O vapor.
40	81	Unlike original patent claim 40, presented reissue claim 81 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode
		reacting with the gas to produce a change in an electrical characteristic between the sensing electrode
		and the counter electrode in the absence of an applied voltage to the sensing electrode" and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of
		approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement
		means."
		Unlike original patent claim 40, presented reissue claim 81 does not recite the language "wherein the electrochemical oas sensor is adapted to detect NO"
		controlled by sensor is auditor to concern to X:

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 42, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81
Original Patent Claim	. 41	42

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
43	81	Unlike original patent claim 43, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 43, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
44	81	Unlike original patent claim 44, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrodes of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 44, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group."

nted Differences in the Claim Language		Unlike original patent claim 45, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 45, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the
Presented	Reissue Claim	81		81
Original	Patent Claim	45		46

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 47, presented reissue claim 81 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	81	·
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 49, presented reissue claim 81 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81
Original Patent Claim	48	49

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
50	81	Unlike original patent claim 50, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 50, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51		Unlike original patent claim 51, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 52, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of carbon black, and the oxher of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of a boxide."
Presented Reissue Claim	81		81
Original Patent Claim	52		

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
. 54	81	Unlike original patent claim 54, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 54, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55	81	Unlike original patent claim 55, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
95	81	Unlike original patent claim 56, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		electrochemical gas sensor is adapted to detect NO _x ."
57	8	Unlike original patent claim 57, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 58, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language and first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 81 does not recite the language "a protonic conductive membrane being in contact with the membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reissue Claim		81
Original Patent Claim	58	

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 61, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 81 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	81	81
Original Patent Claim	09	61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 62, presented reissue claim 81 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	18		81
Original Patent Claim	62		63

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
64		Unlike original patent claim 64, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
65	. 81	Unlike original patent claim 65, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	8	Unlike original patent claim 66, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 66, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO."
	81	Unlike original patent claim 67, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 68, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	81		81
Original Patent Claim	89		69

ted Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 81 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 71, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	<u>8</u>		81
Original Patent Claim	70		71

Differences in the Claim Language		Unlike original patent claim 72, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 72, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 73, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the	other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented	Reissue Claim	8		81	
Original	Patent Claim	72		73	

ented Differences in the Claim Language e Claim	Unlike original patent claim 74, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 74, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	
Presented Reissue Claim	81		8
Original Patent Claim	74		75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 76, presented reissue claim 81 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 77, presented reissue claim 81 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim			81	
Original Patent Claim	76		77	·

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 78, presented reissue claim 81 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	81	
Original Patent Claim	78	

Original Patent Claim 1	Presented Reissue Claim 82	Differences in the Claim Language Unlike original patent claim 1, presented reissue claim 82 recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 1, presented reissue claim 82 does not recite the language "quantitative measurement."
2	82	Unlike original patent claim 2, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 82 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the
		means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte
		membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
3	82	Unlike original patent claim 3, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 3, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	82	Unlike original patent claim 4, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 4, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Designation	82		82	
Original	5		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		82	
Original Patent Claim	7		∞	

Original Patent Claim 9	Presented Reissue Claim 82	Unlike original patent claim 9, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 9, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is
10	82	Unlike original patent claim 10, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 10, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	82		82	
Original Patent Claim	11		12	

Original Patent Claim 13	Presented Reissue Claim 82	Differences in the Claim Language Unlike original patent claim 13, presented reissue claim 82 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	82	Unlike original patent claim 14, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	82		83	
Original Patent Claim	15		16	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
17	83	Unlike original patent claim 17, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 17, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
18		Unlike original patent claim 18, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 18, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	82		82	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	82		82	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	82		82	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 27, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second portons mixed ionic-electronic conductive pump electrodes each having both an electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electroles. power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	83	83
Original Patent Claim	27	28

d Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 82 does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and switch means connects said electrical measurement means to the sensing and counter electrodes; and switch means connects said electrical electrode is placed when said switch means connects said means as a side of the gas sensor where the counter electrode is placed when said switch means	
Presented Reissue Claim	82	·	83	
Original Patent Claim	29		30	

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 31, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	82		83
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	82	Unlike original patent claim 33, presented reissue claim 82 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means."
		Unlike original patent claim 33, presented reissue claim 82 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said sensing and counter electrodes
	=	comprise conductive metal oxides."
34	82	Unlike original patent claim 34, presented reissue claim 82 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means."
		Unlike original patent claim 34, presented reissue claim 82 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 35, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim		,	. 82
Original Patent Claim	35		36

d Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 37, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	85	83
Original Patent Claim	37	38

Differences in the Claim Language		Unlike original patent claim 39, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adanted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented	Reissue Claim	83	82
Original	Patent Claim	39	40

Differences in the Claim Language		Unlike original patent claim 41, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 41, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	82	:	82	
Original	Patent Claim	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 44, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	82		82	
Original Patent Claim	43		44	

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 45, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	83	83
Original Patent Claim	45	46

d Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 47, presented reissue claim 82 does not recite the language "a second protonic conductive electrolyte measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conductive pump electrodes, each having bump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second protous pump electrode and said counter electrode being in contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic"
Presented Reissue Claim	82	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	48		49	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 50, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 50, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 51, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid
Original F Patent Claim Rei	50		51	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	83	Unlike original patent claim 52, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 52, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	82	Unlike original patent claim 53, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 53, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 54, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 54, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect hydrogen."
—	<u> </u>			
Original Patent Claim	54			

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	85	Unlike original patent claim 56, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 56, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57	83	Unlike original patent claim 57, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrical measurement means." Unlike, original patent claim 58, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electricals an electrical measurement means." Unlike original patent claim 59, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "a protonic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrical measurement in electrical characteristic between the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane."
Presented Reissue Claim	83	
Original Patent Claim	28	59

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09	83	Unlike original patent claim 60, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 60, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
61	82	Unlike original patent claim 61, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 61, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 64, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		
Original Patent Claim			9

ed Differences in the Claim Language	Unlike ori conductive and having sensing ele electrolyte having a di said electri	Unlike, original patent claim 66, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is
Presented Reissue Claim	85		83
Original Patent Claim	99		

Pre Reissi	Presented Differences in the Claim Language	ue Claim	Unlike original patent claim 68, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 68, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 82 does not recite the language "quantitative"
		Reissue Claim	83		83

d Differences in the Claim Language	aim	Unlike original patent claim 70, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 70, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 71, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented	Reissue Claim	82		85	
Original	Patent Claim	70		71	

Presented Reissue Claim	Unlike original patent claim 72, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 72, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 73, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first
 Original Patent Claim	72		73	

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 74, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 74, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 75, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting
Prese	Reissue	82		∞	
Original	Patent Claim	74		75	

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 76, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 77, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	82		82	
Original Patent Claim	76		77	·

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 82 recites the language "a first protonic	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive	electrolyte membrane," and also recites the language "said sensing and counter electrodes each	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to	said electrical measurement means."	Unlike, original patent claim 78, presented reissue claim 82 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the sensing, counter, and reference	electrodes each have a first side opposite a second side, and wherein the ionic and electronic	conducting materials are continuous from the first side to the opposite second side within each of the	sensing, counter, and reference electrodes."
Presented Reissue Claim											
Original Patent Claim											

Original Patent Claim	Presented	Differences in the Claim Language
1	83	Unlike original patent claim 1, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 1, presented reissue claim 83 does not recite the language "quantitative measurement."
2	83	Unlike original patent claim 2, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
	·	Unlike original patent claim 2, presented reissue claim 83 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
m	83	Unlike original patent claim 3, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 3, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	83	Unlike original patent claim 4, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 4, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
2	83	Unlike original patent claim 5, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 5, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
9	83	Unlike original patent claim 6, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 6, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language		Unlike original patent claim 7, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented	Reissue Claim	83		83	
Original	Patent Claim	7		∞	

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	83		83	
Original	Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 11, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	83	83	
Original Patent Claim	11	12	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
13	83	Unlike original patent claim 13, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	83	Unlike original patent claim 14, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
15	83	Unlike original patent claim 15, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 15, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
16	83	Unlike original patent claim 16, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 16, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	83		83	
Original Patent Claim	17		18	

1 Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	83		83	
Original Patent Claim	19		20	

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Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	83	1	83	
Original Patent Claim	21		22	

Differences in the Claim Language	l m	Unlike original patent claim 23, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented	Reissue Claim	83		83	
Original	Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 25, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 26, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim		83
Original Patent Claim	25	26

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 29, presented reissue claim 83 does not recite the language "quantitative"	Unlike original patent claim 30, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in	being on approximately 0.1 min to 1 min, recries the language the sensing electrone and the counter electrone being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue	83	83		
Original Patent Claim	29	30		

Original Patent Claim	Presented Reissne Claim	Differences in the Claim Language
31	83	Unlike original patent claim 31, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 31, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
32	83	Unlike original patent claim 32, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	83	Unlike original patent claim 33, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 33, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34		Unlike original patent claim 34, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 34, presented reissue claim 83 does not recite the language "quantitative membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
35		Unlike original patent claim 35, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 35, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36	83	Unlike original patent claim 36, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 36, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 37, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 38, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	83		. 83
Original Patent Claim	37		38

Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 40, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	83		83
Original Patent Claim	39		40

Differences in the Claim Language	m en	Unlike original patent claim 41, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 41, presented reissue claim 83 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	83		83	
Original	Patent Claim	41		42	

nted Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 43, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and a second electrical conductor material and 50-90 wt% of a first and 50-90 wtwo second electrical conductor material and 50-90 wtwo second electrical	Unlike original patent claim 44, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 44, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of
Presented Reissue Claim	83		83	
Original Patent Claim	43		44	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
45		Unlike original patent claim 45, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 45, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	83	Unlike original patent claim 46, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 46, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language,
47	83	Unlike original patent claim 47, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 47, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical electrolyte."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
48	83	Unlike original patent claim 48, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 48, presented reissue claim 83 does not recite the language "quantitative measurement."
49	83	Unlike original patent claim 49, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 49, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
50	83	Unlike original patent claim 50, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 50, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
. 51		Unlike original patent claim 51, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 51, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	$\mathfrak m$	Unlike original patent claim 52, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 52, presented reissue claim 83 does not recite the language "quantitative"	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 53, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented	Reissue Claim	83		83
Original	Patent Claim	52		53

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
54	83	Unlike original patent claim 54, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 54, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55	833	Unlike original patent claim 55, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 55, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	83	Unlike original patent claim 56, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57	83	Unlike original patent claim 57, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 57, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 58, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "stail assuing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrical broad counter electrodes are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 59, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material." and does not recite the language "a porous side of said protonic conductive membrane being in contact with the counter electrode and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode and the counter electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane."
Presented Reissue Claim	83	83
Original Patent Claim	58	29

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 60, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 60, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 61, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference
Pre	Reissı			
Original	Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 62, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 63, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented	Reissue Claim 83		83
Original	Patent Claim 62		

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
	83	Unlike original patent claim 64, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 64, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
\$9	83	Unlike original patent claim 65, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 65, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	83	Unlike original patent claim 66, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 66, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
	83	Unlike original patent claim 67, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 67, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	83	Unlike original patent claim 68, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive
		Unlike, original patent claim 68, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
69	83	Unlike original patent claim 69, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 69, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language		Unlike original patent claim 70, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 70, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 71, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conductive materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented	Reissue Claim	83		83
Original	Patent Claim	70		71

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 72, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 73, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	83.		83	
Original Patent Claim	72		73	

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 74, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 75, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	83		83	
Original Patent Claim	74		75	

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 76, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 77, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	83		83	
Original Patent Claim	76		77	

Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes	and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive	electrolyte membrane," and also recites the language "said sensing and counter electrodes each	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to	said electrical measurement means," and also recites the language "in which the sensing electrode	and the counter electrode are the only two electrodes in contact with the first protonic conductive	electrolyte membrane," and also recites the language "in which the sensing electrode and the counter	electrode are the only two electrodes in contact with the first protonic conductive electrolyte	membrane."	Unlike, original patent claim 78, presented reissue claim 83 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the sensing, counter, and reference	electrodes each have a first side opposite a second side, and wherein the ionic and electronic	conducting materials are continuous from the first side to the opposite second side within each of the	sensing, counter, and reference electrodes."
Presented	Reissue Claim	83														
Original	Patent Claim	78														

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
-	84	Unlike original patent claim 1, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 1, presented reissue claim 84 does not recite the language "quantitative measurement."
2	84	Unlike original patent claim 2, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 84 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical
		connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the
		protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the
		means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
3	. 84	Unlike original patent claim 3, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	84	Unlike original patent claim 4, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 4, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

-	sensing electrode uctive electrolyte vith the gas in the	e "quantitative ter electrodes	ensing electrode ctive electrolyte th the gas in the	ige "quantitative ictive electrolyte r."
-	Unlike original patent claim 5, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	84		84	
Original Patent Claim	\$		9	

Original Patent Claim 7	Presented Reissue Claim 84	Unlike original patent claim 7, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 7, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
∞	84	Unlike original patent claim 8, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	84		84	
Original	Patent Claim	6		10	

Differences in the Claim Language		Unlike original patent claim 11, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	Reissue Claim	84		84	
Original	Patent Claim	11		12	

d Differences in the Claim Language	aim	Unlike original patent claim 13, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented	Reissue Claim	84		84	
Original	Patent Claim	13		41	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	84		84	
Original Patent Claim	15	•	16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	84		84	
Original Patent Claim			18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	84	-	84	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Designs Claim	84		. 84	,
Original	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	84		84	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	84		84	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 28, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	84		84	
Original Patent Claim	27		28	

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	84		84	
Original Patent Claim	29		30	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
31	84	Unlike original patent claim 31, presented reissue claim 84 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrones, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the
		7.3
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
	·	said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein said sensing and counter electrodes
		comprise carbon."
32	84	Unlike original patent claim 32, presented reissue claim 84 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 32, presented reissue claim 84 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said sensing and counter electrodes
		comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 33, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 34, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented	84		84	
Original	33		34	

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 35, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	84		48
Original Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 37, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 38, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	84	·	84	
Original Patent Claim	37		38	

d Differences in the Claim Language		Unlike original patent claim 39, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 39, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means" and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 40, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is
Presented	Reissue Claim	84		84
Original	Patent Claim	39		40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 41, presented reissue claim 84 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	41	·	42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 43, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 44, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	8	84
Original Patent Claim	43	44

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
45	84	Unlike original patent claim 45, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 45, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	84	Unlike original patent claim 46, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 46, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrode cach having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrodes, each having both an electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said sensing and counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode being exposed to a chamber sealed off from the ambrane; means for electrical measurement in electrical contact with said sensing electrode by a perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies and whereby, in a positive ambient concentration of said gas, said electrical measureme
Presented Reissue Claim	84
Original Patent Claim	47

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 48, presented reissue claim 84 does not recite the language "quantitative	measurement."	Unlike original patent claim 49, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	48		49	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 50, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 50, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 51, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of nerfluorinated monomers containing at least one of a sulfaming and counter the sensing at least one of a sulfaming and counter the sensing and counter the sulfaming at least one of a sulfaming and counter the sulfaming at least one of a sulfaming at l
Presi	ω		0	
Original Patent Claim	50		51	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
25	%	Unlike original patent claim 52, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 52, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt%, of platinum."
53		Unlike original patent claim 53, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 53, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
54		Unlike original patent claim 54, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 54, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55	84	Unlike original patent claim 55, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 55, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	84	Unlike original patent claim 56, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 56, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57	48	Unlike original patent claim 57, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Original Patent	Presented Reissue	Differences in the Claim Language
Claim	Claim	
28	84	Unlike original patent claim 58, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 58, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."
26	8	Unlike original patent claim 59, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
	-	Unlike original patent claim 59, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electronic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrical measurement in electrical characteristic between the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09	84	Unlike original patent claim 60, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 60, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference
61	84	Unlike original patent claim 61, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 61, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 64, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 65, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	84		84
Original Patent Claim	64		65

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	84	Unlike original patent claim 66, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 66, presented reissue claim 84 does not recite the language "quantitative"."
67	84	adapted to detect NO _x ." Unlike original patent claim 67, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 67, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	84	Unlike original patent claim 68, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electroles.
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." and also recites the language "said sensing and counter electrodes each
	,	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 68, presented reissue claim 84 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
69	84	Unlike original patent claim 69, presented reissue claim 84 recites the language "a first protonic
,		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 69, presented reissue claim 84 does not recite the language "quantitative
		measurement, and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vanor."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
70	84	Unlike original patent claim 70, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 70, presented reissue claim 84 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
71	84	Unlike original patent claim 71, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 71, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."

	im	Unlike original patent claim 72, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 72, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 73, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Drecented	Reissue Claim	84		84	
Original	Patent Claim	72		73	

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 75, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	84		84	
Original Patent Claim	74		75	

ed Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 76, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 77, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side
Presented Reissue Claim	84		84	
Original Patent Claim	76		77	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
78	84	Unlike original patent claim 78, presented reissue claim 84 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 78, presented reissue claim 84 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the sensing, counter, and reference
		electrodes each have a first side opposite a second side, and wherein the ionic and electronic
		conducting materials are continuous from the first side to the opposite second side within each of the
		sensing, counter, and reference electrodes."

Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 1, presented reissue claim 85 does not recite the language "quantitative measurement."		Unlike original patent claim 2, presented reissue claim 85 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrode from the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is membrane applies a DC power to the sensing and counter electrodes."	Unlike original patent claim 3, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 3, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrodes and the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 4, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	82	85		85	85
Original Patent Claim	-	2		E	4

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
2	. 85	Unlike original patent claim 5, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 5, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides,"
9	85	Unlike original patent claim 6, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 6, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
7	85	Unlike original patent claim 7, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane", and also recites the language "in which the sensing electrode and the counter electrode
		>
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original natent claim 7 presented reisene claim 85 does not recite the language "guantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
×	85	This original patent claim 8 presented reissue claim 85 recites the language "the sensing electrode
))	and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
6	82	Unlike original patent claim 9, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 9, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
10	82	Unlike original patent claim 10, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 10, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
11	88	Unlike original patent claim 11, presented reissue claim 85 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		memorane," and also recites the language "in which the sensing electrode and the counter electrode
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original natent claim 11, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect H ₂ S."
12	88	Unlike original patent claim 12, presented reissue claim 85 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 12, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect H ₂ O vapor."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	88	Unlike original patent claim 13, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	85	Unlike original patent claim 14, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	85		85	
Original Patent Claim	15		16	

ted Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the
Presented Reissue Claim	88		88	
Original Patent Claim	17		18	

d Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second muniting electrodes commiss notle metals."
Presented Reissue Claim	88		88	
Original Patent Claim	19		20	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
21	85	Unlike original patent claim 21, presented reissue claim 85 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 21, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electronic and ionic conducting
		materials of the first and second pumping electrodes comprise conductive metal oxides."
22	85	Unlike original patent claim 22, presented reissue claim 85 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 22, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the first and second pumping
		electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane
		has a thickness of about 0.17 mm."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
23	85	Unlike original patent claim 23, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
	·	Unlike original patent claim 23, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	58 ·	Unlike original patent claim 24, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	85		85	
Original Patent Claim	25		26	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
27	88	Unlike original patent claim 27, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 27, presented reissue claim 85 does not recite the language "quantitative"
·		comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.
28	85	Unlike original patent claim 28, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 28, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 31, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 32, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes commisse noble metals."
Presented Reissue Claim	85		82
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	88	Unlike original patent claim 33, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 33, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	85	Unlike original patent claim 34, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 34, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
35		Unlike original patent claim 35, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 35, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36		Unlike original patent claim 36, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37		Unlike original patent claim 37, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode." and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 37, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."
38		Unlike original patent claim 38, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 38, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	85	Unlike original patent claim 39, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 39, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	82	Unlike original patent claim 40, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 40, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NOx."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
41	85	Unlike original patent claim 41, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 41, presented reissue claim 85 does not recite the language "quantitative measurement."
42	85	Unlike original patent claim 42, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
-	-	Unlike original patent claim 42, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

nted Differences in the Claim Language Claim		Unlike original patent claim 43, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 44, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of
Presented Reissue Claim	88		88
Original Patent Claim	43		4

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 45, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 46, presented reissue claim 85 does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement," and also does not recite the language "wherein one of the first and second electrical conductor measurement."
Pres	Reissu			
Original	Patent Claim	45		46

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electroal counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electroally connected to said electrical measurement means," and also recites the language "said sensing and counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes; in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrode being separated from second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber scaled off from the ambient atmosphere; said second porous pump electrode and said counter electrode being in contact with said sensing material, both said sensing and counter electrodes and said counter electrode being in contact with said sensing electrode and said counter electrode being in contact with said first pump electrode and said counter electrode being un contact with said first pump electrode and said counter electrode being in contact with said first pump electrode and said counter electrode being in contact with sa
Presented Reissue Claim	85
Original Patent Claim	47

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 48, presented reissue claim 85 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane, and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 49, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	85	85
Original Patent Claim	48	49

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
90	85	Unlike original patent claim 50, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 50, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51	82	Unlike original patent claim 51, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 51, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
52	. · .	Unlike original patent claim 52, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 52, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
23	82	Unlike original patent claim 53, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 53, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

anted Differences in the Claim Language		Unlike original patent claim 54, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 54, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	
Presented	Reissue Claim	88		
Original	Patent Claim	54		55

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
95	88	Unlike original patent claim 56, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode can applied voltage to the sensing electrode."
		Unlike, original patent claim 56, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO_x ."
57	85	Unlike original patent claim 57, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode." Unlike, original patent claim 58, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "staid sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrode reacts with the first protonic conductive electrolyte membrane contact with the sensing electrode and the counter electrode are the only two electrode reacts with the gas in the absence of an applied voltage to the sensing electrode reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "a protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode; the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrode, means for electrical measurement in electrical characteristic between the sensing electrode and said reference electrode, whereby the gas is transported away from the reference electrody membrane applying a DC power across said protonic electrolyte membrane for electrolyte membrane applying electrody and protonic electrolyte membrane electrolyte membrane arcoss
Presented Reissue Claim	85	85
Original Patent Claim	28	

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 60, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 61, presented reissue claim 85 does not recite the language "wherein said sensing, count and reference electrodes commisse noble metals."
Presented Reissue Claim	85		85
Original Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 62, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 63, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88	·	85
Original Patent Claim			

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 64, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 65, presented reissue claim 85 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	58		88
Original Patent Claim	64		

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 66, presented reissue claim 85 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 67, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adanted to detect hydrogen."
Presented Reissue Claim	\$8		8
Original Patent Claim	99		67

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 68, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 69, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim			85
Original Patent Claim	. 89		

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 70, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 71, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	85		85	
Original Patent Claim	70		71	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	85	Unlike original patent claim 72, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 72, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73		Unlike original patent claim 73, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 73, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Unlike original patent claim 74, presented electrolyte membrane in between and in thickness in the range of approximately 0.1 counter electrode being on opposite sides recites the language "said sensing and count 1 mm to 15 mm, and being electrically collanguage "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence electrode reacts with the gas in the absence second electrical conductor materials for the materials for the counter and reference electrolyte membrane in between and in thickness in the range of approximately 0.1 counter electrolyte membrane in between and in thickness in the range of approximately collanguage "said sensing and counter fectrode being on opposite sides recites the language "said sensing electrolyte relectrolyte relectrolyte relectrolyte relectrolyte relectrolyte relectrolyte relectrolyte resensing lectrode a the first protonic conductive electrolyte relectrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the have a first side or or recite the	
88	Unlike original patent claim 74, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
\$8	thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
\$8	counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
88	I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
88	the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing
85	electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
88	Unlike, original patent claim 74, presented reissue claim 85 does not recite the language "quantitative
88	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and
\$	second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
thickness in the range of approximately 0.1 counter electrode being on opposite sides recites the language "said sensing and coun 1 mm to 15 mm, and being electrically con language "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the bayes a first side ounceits a second side.	Unlike original patent claim 75, presented reissue claim 85 recites the language "a first protonic conductive
counter electrode being on opposite sides recites the language "said sensing and coun 1 mm to 15 mm, and being electrically con language "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the bayer a first side ounceite a second side.	electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
recites the language "said sensing and coun I mm to 15 mm, and being electrically con language "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the bayes a first side ounceits a second side.	thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
1 mm to 15 mm, and being electrically con language "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the bayes a first side oungeits a second side.	counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of counterelectrodes."
language "in which the sensing electrode a the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the bayes a first side ounceite a second side	I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the
the first protonic conductive electrolyte relectrode reacts with the gas in the absence Unlike original patent claim 75, present measurement," and also does not recite the baye a first side ounceite a second side.	language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
Unlike original patent claim 75, present measurement," and also does not recite the baye a first side ounceite a second side	the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing
Unlike original patent claim 75, present measurement," and also does not recite the have a first side ounceite a second side	electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
measurement," and also does not recite the have a first side outside a second side	Unlike original patent claim 75, presented reissue claim 85 does not recite the language "quantitative
	t," and also does not recite the language "wherein the sensing and the counter electrodes each side onnosite a second side and wherein the ionic and electronic conducting materials are
	continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes." Unlike original patent claim 77, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 77, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing.	counter, first pumping, and second pumping electrodes."
Presented Reissue Claim		88	
Original Patent Claim	76	77	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
78	85	Unlike original patent claim 78, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language "in which the sensing electrode and the counter
		electrode are the only two electrodes in contact with the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode reacts with the gas in the
		absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 78, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the sensing, counter, and reference
		electrodes each have a first side opposite a second side, and wherein the ionic and electronic
		conducting materials are continuous from the first side to the opposite second side within each of the
		sensing, counter, and reference electrodes."

Unlike original patent claim 1, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 1, original reissue claim 86 does not recite the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 86 does not recite the language "and also recites the language "said electrical measurement means for applying DC power across the protonic conductive electrolyte membrane; and switch means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrode.	Original	Presented	Differences in the Claim Language
98	Patent Claim	Reissue Claim	
98	1	98	Unlike original patent claim 1, presented reissue claim 86 recites the language "a non-biased
98			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the
98			language "said electrical measurement means detects changes in said electrical characteristic in the
98			absence of any biasing voltage."
98			
98			Unlike original patent claim 1, original reissue claim 86 does not recite the language "quantitative
98			measurement."
electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites language "said electrical measurement means detects changes in said electrical characteristic in absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantita measurement," does not recite the language "means for applying DC power across the prott conductive electrolyte membrane; an electrical connection between the sensing electrode, the counembrane, and switch means for alternating an electrical connection between the sensing electron and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrome membrane applies a DC power to the sensing and counter electrodes."	2	98	Unlike original patent claim 2, presented reissue claim 86 recites the language "a non-biased
language "said electrical measurement means detects changes in said electrical characteristic in absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantita measurement," does not recite the language "means for applying DC power across the protoconductive electrolyte membrane; an electrical connection between the sensing electrol electrode, and the means for alternating an electrical connection between the sensing electron and counter electrode from the electrical measurement means to the means for applying DC po across the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electron membrane applies a DC power to the sensing and counter electrodes."			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the
absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantita measurement," does not recite the language "means for applying DC power across the protuce electrolyte membrane; an electrical connection between the sensing electrolectrode, and the means for applying DC power across the protonic conductive electrode from the electrical measurement means to the means for applying DC poserous the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrol membrane applies a DC power to the sensing and counter electrodes."			language "said electrical measurement means detects changes in said electrical characteristic in the
Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantita measurement," does not recite the language "means for applying DC power across the prote conductive electrolyte membrane; an electrical connection between the sensing electrone electrode, and the means for applying DC power across the protonic conductive electrone membrane; and switch means for alternating an electrical connection between the sensing electrone and counter electrode from the electrical measurement means to the means for applying DC popurations the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrone membrane applies a DC power to the sensing and counter electrodes."			absence of any biasing voltage."
Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantita measurement," does not recite the language "means for applying DC power across the protonic conductive electrode, and the means for applying DC power across the protonic conductive electroments; and switch means for alternating an electrical connection between the sensing electrand counter electrode from the electrical measurement means to the means for applying DC posers the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."			
measurement," does not recite the language "means for applying DC power across the prote conductive electrolyte membrane; an electrical connection between the sensing electrode, the couneelectrode, and the means for applying DC power across the protonic conductive electronand and counter electrode from the electrical measurement means to the means for applying DC poseross the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electronand membrane applies a DC power to the sensing and counter electrodes."			Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantitative
conductive electrolyte membrane; an electrical connection between the sensing electrode, the couneetrode, and the means for applying DC power across the protonic conductive electrometrane; and switch means for alternating an electrical connection between the sensing electrometron counter electrode from the electrical measurement means to the means for applying DC poseross the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrometrolyte membrane applies a DC power to the sensing and counter electrodes."			measurement," does not recite the language "means for applying DC power across the protonic
electrode, and the means for applying DC power across the protonic conductive electromembrane; and switch means for alternating an electrical connection between the sensing electromed counter electrode from the electrical measurement means to the means for applying DC posers the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrometric membrane applies a DC power to the sensing and counter electrodes."			conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter
membrane; and switch means for alternating an electrical connection between the sensing electrand counter electrode from the electrical measurement means to the means for applying DC poacross the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electromeans and counter electrodes."			electrode, and the means for applying DC power across the protonic conductive electrolyte
and counter electrode from the electrical measurement means to the means for applying DC po across the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrometer membrane applies a DC power to the sensing and counter electrodes."			membrane; and switch means for alternating an electrical connection between the sensing electrode
across the protonic conductive electrolyte membrane; whereby the gas is transported away from counter electrode when the means for applying DC power across the protonic conductive electrome membrane applies a DC power to the sensing and counter electrodes."			and counter electrode from the electrical measurement means to the means for applying DC power
counter electrode when the means for applying DC power across the protonic conductive electrometer electrodes."			across the protonic conductive electrolyte membrane; whereby the gas is transported away from the
membrane applies a DC power to the sensing and counter electrodes."			counter electrode when the means for applying DC power across the protonic conductive electrolyte
			membrane applies a DC power to the sensing and counter electrodes."

Differences in the Claim Language		Unlike original patent claim 3, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 3, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented	Reissue Claim	98		98	
Original	Patent Claim	က	-	4	

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 5, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 6, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	98		98	
Original Patent Claim	S		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98		98	
Original Patent Claim	7		∞	

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	98		98	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	98		98	
Original Patent Claim			12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	98		98	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	98		98	
Original Patent Claim	15		16	

d Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	98		98	
Original Patent Claim	17		18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	98		98	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 21, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 22, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	21		22	

Original Dotont Cloim	Presented	Differences in the Claim Language
raicht Clain	Neissue Ciailli	1 11 12 12 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15
£23	08	Unlike original patent claim 23, presented reissue claim 80 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 23, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical
		CONDUCTOR INSTERIST
24	98	Unlike original patent claim 24, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 24, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 25, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 26, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	98	98
Original Patent Claim	25	26

Original 27 28	Presented Reissue Claim 86 86	Unlike original patent claim 27, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 27, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electrodes being separate from said sensing and counter electrodes each having both an electrodes being separate from sid sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive membrane; means for applying DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes." Unlike original patent claim 28, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electricial in the
		absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 29, presented reissue claim 86 does not recite the language "quantitative"	measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 30, presented reissue claim 86 does not recite the language "quantitative measurement" and does not recite the language "quantitative measurement" and does not recite the language "quantitative measurement".	membrane, and soon to context electrodes having in electrical connection therebetween source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	98			
Original Patent Claim	29			·

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 31, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	98	98
Original Patent Claim	31	32

d Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 33, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 34, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	98	98
Original Patent Claim	33	34

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 55, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 36, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98		98
Original Patent Claim	35		36

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37	98	Unlike original patent claim 37, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		I Inlike animinal natent claim 37 presented reisone claim 86 does not regite the language "amantitative
		Contract of the figure of the first of the f
		measurement, and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect hydrogen."
38	98	Unlike original patent claim 38, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 38, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ S."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	98	Unlike original patent claim 39, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ O vapor."
40	98	Unlike original patent claim 40, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect NO _x ."

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 41, original reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Designs Clean	86		98	
Original	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 43, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 44, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98
Original Patent Claim	43		44

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrode by a perforated on opposite sides of pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode being in contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	98	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 48, presented reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 49, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	48		49	

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 50, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98
Original Patent Claim	20		51

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	98	Unlike original patent claim 52, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 52, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	98	Unlike original patent claim 53, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 53, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical
		conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Pre Reiss	Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 54, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
	Presi	Reissu		·	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	98	Unlike original patent claim 56, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
,		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 56, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect NO _x ."
57	98	Unlike original patent claim 57, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
-		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 57, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ O vapor."

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 58, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 58, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means," and dose not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode, means for electrical measurement in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane and whereby, in a positive ambrane applies a DC power across said protonic electrolyte membrane.
Pre	Reissu		
Original	Patent Claim	28	59

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09	98	Unlike original patent claim 60, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means, and also recites the language said electrical measurement means detects changes in said electrical characteristic in the absence of any histing voltage."
		Changes in Said efective characteristic in the ausence of any brashing voltage.
	···	Unlike original patent claim 60, presented reissue claim 86 does not recite the language "quantitative
-		measurement," and does not recite the language "wherein said sensing, count and reference
		electrodes comprise carbon."
61	98	Unlike original patent claim 61, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 61, presented reissue claim 86 does not recite the language "quantitative
-		
		electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
62	98	Unlike original patent claim 62, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
•		Unlike original patent claim 62, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein said sensing, counter and reference
į		electrodes comprise conductive metal oxides."
63	98	Unlike original patent claim 63, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 63, presented reissue claim 86 does not recite the language "quantitative
	-,	measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially commised of a solid nerfluorinated ion-exchange nolymer."
		monitorate to accommunity comprised of a some, permanent, for exemunity portunities.

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
64	98	Unlike original patent claim 64, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 64, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
65	98	Unlike original patent claim 65, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means, and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any brasing voltage."
		Unlike original patent claim 65, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		Louis and the second se

Dulike original patent claim 66, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere; "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrically connected to said electrical measurement means," and also recites the language "said electrically connected to said electrical measurement," and also recites the language "wherein the electrochemical gas sensor is adapted to detect NO ₂ ." Unlike original patent claim 65, presented reissue claim 86 does not recite the language "wherein the electrochemical gas sensor for measurement of a gas in an ambient amosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 15 mm," also recites the language "said electrical measurement means," and also recites the language "said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement means," and also recites the language "said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	Original	Presented	Differences in the Claim Language
98	Patent Claim	Reissue Claim	
98	99	98	Unlike original patent claim 66, presented reissue claim 86 recites the language a non-biased
98			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
98			language "a first protonic conductive electrolyte membrane in between and in contact with the
98			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
98			mm", also recites the language "said sensing and counter electrodes each having a diameter in the
98			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
98			measurement means," and also recites the language "said electrical measurement means detects
98			changes in said electrical characteristic in the absence of any biasing voltage."
98			
98			Unlike original patent claim 66, presented reissue claim 86 does not recite the language "quantitative
98			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
98			detect NO _x ."
electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	<i>L</i> 9	98	Unlike original patent claim 67, presented reissue claim 86 recites the language a non-biased
language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			language "a first protonic conductive electrolyte membrane in between and in contact with the
mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	·		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			measurement means," and also recites the language "said electrical measurement means detects
Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			changes in said electrical characteristic in the absence of any biasing voltage."
Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			
measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."			Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative
detect hydrogen."			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
			detect hydrogen."

Patent Claim 86 Unlike original patent claim 68, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient amosphere, also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "said electrical counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "said electrically connected to said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 68, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S." Unlike original patent claim 69, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient amosphere," also recites the language "said electrically connected to said electricall measurement means, and having a thickness in the range of approximately 0.1 mm to 15 mm, and being electrically connected to said electrical changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vanor."	Original	Presented	Differences in the Claim Language
98	Patent Claim	Reissue Claim	
98	89	98	Unlike original patent claim 68, presented reissue claim 86 recites the language a non-biased
98			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
98			language "a first protonic conductive electrolyte membrane in between and in contact with the
98			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
98			mm", also recites the language "said sensing and counter electrodes each having a diameter in the
98			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
98			measurement means," and also recites the language "said electrical measurement means detects
98			changes in said electrical characteristic in the absence of any biasing voltage."
98			
98			Unlike original patent claim 68, presented reissue claim 86 does not recite the language "quantitative
98			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
98			detect H ₂ S."
electrochemical gas sensor for measurement of a gas in an ambient atmosphere," all language "a first protonic conductive electrolyte membrane in between and in consensing and counter electrodes, and having a thickness in the range of approximately mm", also recites the language "said sensing and counter electrodes each having a drange of approximately 1 mm to 15 mm, and being electrically connected to measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senson detect H ₂ O vanor."	69	98	Unlike original patent claim 69, presented reissue claim 86 recites the language a non-biased
language "a first protonic conductive electrolyte membrane in between and in consensing and counter electrodes, and having a thickness in the range of approximately mm", also recites the language "said sensing and counter electrodes each having a drange of approximately 1 mm to 15 mm, and being electrically connected to measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas sensoned detect H ₂ O vapor."			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
sensing and counter electrodes, and having a thickness in the range of approximately mm", also recites the language "said sensing and counter electrodes each having a d range of approximately 1 mm to 15 mm, and being electrically connected to measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."			language "a first protonic conductive electrolyte membrane in between and in contact with the
mm", also recites the language "said sensing and counter electrodes each having a d range of approximately 1 mm to 15 mm, and being electrically connected to measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
range of approximately 1 mm to 15 mm, and being electrically connected to a measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."			mm", also recites the language "said sensing and counter electrodes each having a diameter in the
measurement means," and also recites the language "said electrical measurement changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."		_	measurement means," and also recites the language "said electrical measurement means detects
Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vapor."			changes in said electrical characteristic in the absence of any biasing voltage."
Unlike original patent claim 69, presented reissue claim 86 does not recite the language measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."		· · · · · · · · · · · · · · · · · · ·	
measurement," and does not recite the language "wherein the electrochemical gas senso detect H ₂ O vanor."			Unlike original patent claim 69, presented reissue claim 86 does not recite the language "quantitative
detect H ₂ O vapor."			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
			detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 70, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 71, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	98	98
Original Patent Claim	70	71

Original	Presented	Differences in the Claim Language
72	Se S	Unlike original natent claim 72 presented reissue claim 86 recites the language a non-hiased
!)	gas sensor for measurement of a gas in an ambient atmosphere," also
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		measurement means." and also recites the language "said electrical measurement means defects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Thilbs original natest claim 72 presented reisons claim 86 does not regite the language "on outtotive
		measurement." and does not recite the language "wherein the proton conductor material for both the
		sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a
		side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic
		acid group."
73	98	Unlike original patent claim 73, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 73, presented reissue claim 86 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein one of the first and second electrical
		conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first
		and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 74, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 75, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	98		08	
Original Patent Claim	74		75	

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 86 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 86 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	98		98
Original Patent Claim	76		77

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
78	98	Unlike original patent claim 78, presented reissue claim 86 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
	_	mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 78, presented reissue claim 86 does not recite the language "wherein the
		sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein
		the ionic and electronic conducting materials are continuous from the first side to the opposite second
		side within each of the sensing, counter, and reference electrodes."

I Differences in the Claim Language		Unlike original patent claim 1, original reissue claim 87 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 2, presented reissue claim 87 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	87		28	
Original Patent Claim	1		2	

Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 3, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	87		87	
Original Patent Claim	რ		4	

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 5, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes	comprise conductive metal oxides." Unlike original patent claim 6, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 6, presented reissue claim 87 does not recite the language "wherein the protonic conductive electrolyte measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	87	87
Original Patent Claim		. 9

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
7	87	Unlike original patent claim 7, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
-11-		
		Unlike original patent claim 7, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the protonic conductive electrolyte
		membrane is a metal oxide protonic conductor electrolyte membrane."
8	87	Unlike original patent claim 8, presented reissue claim 87 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing
		voltage."
	-	Unlike original patent claim 8, presented reissue claim 8/ does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect CO."

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 9, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 10, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	87	87
Original Patent Claim	6	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	87			
Original Patent Claim			12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	8.7		87	
Original Patent Claim	13		41	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	87		87	
Original Patent Claim	15		16	

d Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissne Claim	87		87	
Original Patent Claim	19		20	

Original	Presented	Differences in the Claim Language
21	87	Unlike original patent claim 21, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 21, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."
22	87	Unlike original patent claim 22, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 22, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	87		87	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim			87	
Original Patent Claim	25		26	

Differences in the Claim Language	E E	Unlike original patent claim 27, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte
Presented	Reissue Claim	<i>L</i> 8		87
Original	Patent Claim	27		28

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
29	84	Unlike original patent claim 29, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 29, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
30	87	Unlike original patent claim 30, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 30, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power across the membrane; and switch means for applying a DC pulse power across the membrane; and switch means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
31	87	Unlike original patent claim 31, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 31, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."
. 32	87	Unlike original patent claim 32, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 33, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 34, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	87		87	
Original Patent Claim			34	

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	
Presented Reissue Claim	87		87
Original Patent Claim	. 35		36

Differences in the Claim Language		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen." Unlike original patent claim 38, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 38, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	87	87
Original Patent Claim	37	38

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	87	Unlike original patent claim 39, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 39, presented reissue claim 87 does not recite the language "quantitative measurement" and does not recite the language "wherein the electrochemical gas sensor is adored to detect
		H ₂ O vapor."
40	87	Unlike original patent claim 40, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrical measurement means and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

Differences in the Claim Language	im	Unlike original patent claim 41, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	measurement."	Unlike original patent claim 42, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 42, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about
Presented	Reissue Claim	87		
Original	Patent Claim	41		42

Original	Presented	Differences in the Claim Language
Fatent Claim	Keissue Claim	
43		Unlike original patent claim 43, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	·	Unlike original patent claim 43, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
44	<i>8</i> 4	Unlike original patent claim 44, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 44, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

ed Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 45, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 46, presented reissue claim 87 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1.50 wt% of Bu oxide."
Presented Reissue Claim	. 87		87	
Original Patent Claim	45		46	

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyte membrane; first and second porrous mixed ionic-electronic conductive pump electrodes, each having both an electronic separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode being in contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	<i>L</i> 8	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 48, presented reissue claim 87 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 49, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
	Unlike original electrochemical language "the set the first protoni measurement m voltage." Unlike original preasurement."	Unlike original electrochemical language "the se the first protoni measurement m voltage." Unlike original measurement," of about 10 mm mm."
Presented Reissue Claim	28	87
Original Patent Claim	48	49

ed Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 50, presented reissue claim 87 does not recite the language "quantitative"	sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials." Unlike original patent claim 51, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm', also recites the language "said sensing electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	87	84
Original Patent Claim	50	51

Patent Claim	Presented Reissue Claim	Differences in the Claim Language Thilke original natest claim 52 presented reisene claim 87 recites the language a non-biased electrochemical
	ò	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 52, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
23	8.4	Unlike original patent claim 53, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 53, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second

ited Differences in the Claim Language			measurement, and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO." Unlike original patent claim 55, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	84	87
Original	Patent Claim		55

nted Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vanor."
Presented Deign Claim	87		87
Original	56		57

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 58, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 59, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode; means for electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for electrode, the bottom in electrical contact between the sensing electrode and said reference electrode, whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reissue Claim	87		
Original Patent Claim	28		59

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise carbon." Unlike original patent claim 61, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 61, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes commise noble metals."
	Unlike electroc language sensing mm", a range c measure the only recites characte	electrod Unlike electroc languag sensing mm", a range o measure the only recites characte measure
Presented Reissue Claim	8.4	87
Original Patent Claim	09	61

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
62	87	Unlike original patent claim 62, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 62, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63		Unlike original patent claim 63, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
64	87	Unlike original patent claim 64, presented reissue claim 87 recites the language a non-biased electrochemical
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a fluckness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of annioximately 1 mm to 15 mm, and being
		electrically connected to said electrical measurement means," also recites the language "the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte
		memorane, and also recues the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Thise original natent claim 64 precented reisens aloin 87 does not easily the language temperation.
		measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a
		metal oxide protonic conductor electrolyte membrane."
65	87	Unlike original patent claim 65, presented reissue claim 87 recites the language a non-biased electrochemical
		gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and
		counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being
		electrically connected to said electrical measurement means," also recites the language "the sensing electrode
		membrane," and also recites the language "said electrical measurement means detects changes in said
		electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 65, presented reissue claim 8/ does not recite the language "quantitative measurement" and does not regite the language "wherein the electrochemical an concar is adouted to detect
		incasurentent, and does not recite the fanguage, wherein the electrochemical gas sensol is anapted to defect. [CO.]

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 68, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	87		
Original Patent Claim	89		. 69

nted Differences in the Claim Language		Unlike original patent claim 70, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 70, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 71, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said
Presented	Reissue Claim	87		84	
Original	Patent Claim	70		71	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	87	Unlike original patent claim 72, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	-	Unlike original patent claim 72, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73		Unlike original patent claim 73, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 73, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
74	87	Unlike original patent claim 74, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 74, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75	87	Unlike original patent claim 75, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 75, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
76	87	Unlike original patent claim 76, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	·	Unlike original patent claim 76, presented reissue claim 87 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
77	87	Unlike original patent claim 77, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 77, presented reissue claim 87 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."

Original Patent Claim 78	Presented Reissue Claim 87	Unlike original patent claim 78, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 78, presented reissue claim 87 does not recite the language "wherein the sensing counter and reference electrodes each have a first side opnosite a second side and wherein
-		the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
1	88	Unlike original patent claim 1, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 1, original reissue claim 88 does not recite the language "quantitative measurement."
7	%	Unlike original patent claim 2, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 2, presented reissue claim 88 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
3	88	Unlike original patent claim 3, presented reissue claim 88 recites the language "a non-biased
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
_		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 3, presented reissue claim 88 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein said sensing and counter electrodes
		comprise carbon."
4	88	Unlike original patent claim 4, presented reissue claim 88 recites the language "a non-biased electrochemical oas sensor for measurement of a oas in an ambient atmosphere" also recites the
	-a,	language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Thilbs animal natest claim 4 presented reissue claim 88 does not recite the languae "augutiative
		Unitary Original parent ciains 4, presented recision claims of door not recirc are surfaced years and managed from the longings "triborain and counter alentrodes
		measurement, and does not recite the language wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 5, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 6, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88	88
Original Patent Claim	\$	9

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	88		88	
Original Patent Claim	7		∞	

ed Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
Presented	Reissue Claim	88		88	
Original	Patent Claim	6		10	

Original Patent Claim 11 12	Presented Reissue Claim 88 88	Unlike original patent claim 11, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 11, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H2S." Unlike original patent claim 12, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 12, presented reissue claim 88 does not recite the language "quantitative Unlike original patent claim 12, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to

Differences in the Claim Language		Unlike original patent claim 13, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented	Reissue Claim	&		88 8	
Original	Patent Claim	13		41	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	88	·	888	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	88		88	
Original Patent Claim	17		18	

PresentedDifferences in the Claim LanguageReissue ClaimWare claim88Unlike original patent claim19, presented reissue claim	Differences in the Cl Unlike original patent claim 19, presented reissue	Differences in the Claim Language ginal patent claim 19, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 19, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."
20	&	Unlike original patent claim 20, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 20, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
21	88	Unlike original patent claim 21, presented reissue claim 88 recites the language "a non-biased
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Traile original natent claim 21 presented reisons claim 88 does not regite the longer some sometitation
		measurement" and does not resite the lormings "typesia the clostenic and ionic conditative
		materials of the first and second pumping electrodes comprise conductive metal oxides."
22	88	Unlike original patent claim 22, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 22, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the first and second pumping electrodes
		have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a
		thickness of about 0.17 mm."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
23	88	Unlike original patent claim 23, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 23, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	88	Unlike original patent claim 24, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 24, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

nted Differences in the Claim Language Claim	Unlike original patent claim 25, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	8	-	88	
Original Patent Claim	25		26	

Original Patent Claim	Presented Reisene Claim	Differences in the Claim Language
29	88	Unlike original patent claim 29, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
!		Unlike original patent claim 29, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
30	88	Unlike original patent claim 30, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 30, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor
		where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 31, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	88		88
Original Patent Claim	31		32

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 36, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	& &	-	88
Original Patent Claim	35		36

ented Differences in the Claim Language Claim	Unlike original patent claim 37, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 37, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	
Presented Reissue Claim	88		88
Original Patent Claim	37		38

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	88	Unlike original patent claim 39, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode
		reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any
		biasing voltage."
		Unlike original patent claim 39, presented reissue claim 88does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect
		H ₂ O vapor."
40	88	Unlike original patent claim 40, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic
	-	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being
		electrically connected to said electrical measurement means," also recites the language "the sensing electrode
		reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any
		biasing voltage."
		Unlike original patent claim 40, presented reissue claim 88does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
		, and the same of

Differences in the Claim Language		Unlike original patent claim 41, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 41, original reissue claim 88does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 88does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	88		88	
Original	Patent Claim	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 43, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 44, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	88		88	
Original Patent Claim	43		44	

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 45, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and does not recite the language "wherein one of the first and second electrical conductor measurement," and second electrodes and the first and second electrical conductor measurement and second electrodes and	electrical conductor materials for the sensing electrode is 1-50 wt% of platinum." Unlike original patent claim 46, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 46, presented reissue claim 88 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	88	88
Original Patent Claim	45	46

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
48	88	Unlike original patent claim 48, presented reissue claim 88 recites the language "a non-biased electrochemical oas sensor for measurement of a oas in an ambient atmosphere", also recites the
	_	language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 48, presented reissue claim 88 does not recite the language "quantitative
		measurement."
49	88	Unlike original patent claim 49, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Traffic original natural claim 40 mesconted resigns of claim 80 does not recite the learness than the traffic or
		United Original patent ciann 43, presented reissue ciann 66 does not recite the ranguage quantitative
		measurement," and does not recite the language "wherein the sensing and electrodes have a diameter
		of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17
		mm."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
20	∞	Unlike original patent claim 50, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 50, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51	88	Unlike original patent claim 51, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

ed Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 52, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 53, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	88		8
Original Patent Claim	52		53

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 54, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	88		88
Original Patent Claim	54		

Differences in the Claim Language		Unlike original patent claim 56, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	Reissue Claim			
Original	Patent Claim	99		57

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 58, presented reissue claim 88 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 59, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and said reference electrode, in electrical contact between the sensing electrode, means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a positive and detects changes in said electrical characteristic."
Presented Reissue Claim	88	88
Original Patent Claim	58	59

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09	88	Unlike original patent claim 60, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
·		Unlike original patent claim 60, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
61	88	Unlike original patent claim 61, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode reacts with the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 61, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical, and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	888		88
Original Patent Claim	62		63

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
64	88	Unlike original patent claim 64, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 64, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
	88	Unlike original patent claim 65, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 65, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
99	88	Unlike original patent claim 66, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 66, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _{x."}
	88	Unlike original patent claim 67, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Differences in the Claim Language		Unlike original patent claim 68, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 69, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	88		8
Original Patent Claim	89		. 69

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
70	88	Unlike original patent claim 70, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 70, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
71	88	Unlike original patent claim 71, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 71, presented reissue claim 88 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 72, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 1.5 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 73, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of platinum."
Presented Reissue Claim	88		8 8
Original Patent Claim	72 ·		73

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 74, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 75, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	88		88
Original Patent Claim	74		

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electricals a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 88 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 88 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping, and second pumping and second pumping and second pumping electrodes."
Presented Decision Claim	88		88
Original	76		77

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 88 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	&	
Original Patent Claim	78	